# Factor Pairs

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# CONCEPT 1

# Factor Pairs

Here you'll learn how to find factor pairs of given numbers.

Have you ever been to a class social? Have you ever been in charge of organizing an event at school?



The sixth grade class is having a social in four weeks on a Friday night. The last time that the sixth grade had a social, it was a little unorganized and the teachers weren't happy. This time, Allison (President of the sixth grade class) and Hector (the Vice President) have promised to organize it and have a plan for all of the students.

Allison and Hector have been working together to plan different activities. They have decided to have music in the gym, food in the cafeteria, board games in one classroom and basketball outside in the courtyard. They think that having enough options will keep things less chaotic. Now that they have the activities planned, they have to figure out how to arrange the students in groups. Each group will have a certain period of time at each activity. The sixth grade has two clusters made up of two classes each.

Cluster 6A has 48 students in it.

Cluster 6B has 44 students in it.

Allison and Hector want to arrange the clusters into reasonably sized groups so that the students can hang out together, but so that the teachers will be happy too. They are struggling with how best to arrange the students to visit each of the four activities. They want the groups to be a small enough size, but to be even too.

**In this Concept you will learn how to identify factor pairs. Factor pairs is one way to help Hector and Allison with their dilemma.**

## Guidance

This Concept is all about *factors*, and that is where we are going to start. In order to complete the work in this Concept, you will first need to understand and identify a *factor*.

**What is a factor?**

When you **multiply**, the numbers that are being multiplied together are the factors of the product. Said another way, *a factor is a number or a group of number that are multiplied together for a product. Groups of numbers including subtraction or addition operations are not single factors.*

In this Concept, you will be finding *factor pairs*. This is when only **two numbers** are multiplied together for a product.

Notice that the key operation
with factors is multiplication!

Let's find some factors.

What are two factors of twelve? Here we want to find two factors of twelve or two numbers that multiply together to give us twelve. We could list many possible factors for twelve. Let's choose 3 and 4.

**Our answer is 3 $\times$ 4.**

**What if we wanted to list out all of the factors of twelve?**

To do this systematically, we should first start with the number 1. Yes, one is a factor of twelve. **In fact, one is a factor of every number because any number can be multiplied by one to get itself as a product.**

$1 \times 12$

After starting with 1, we can move on to 2, then 3 and so on until we have listed out all of the factors for 12.

$$1 \times 12$$
$$2 \times 6$$
$$3 \times 4$$

**5, 7, 8 etc are not factors of 12 because we can't multiply them by another number to get 12.**

**These are all of the factors for 12.**

Notice that we are using our times
tables to identify the factors!

Now it's time for you to practice. List out all of the factors for each value.

**Example A**

36

**Solution:** $1, 36, 2, 18, 3, 12, 4, 9, 6$

**Example B**

24

**Solution: </math>1, 24, 2, 12, 3, 8, 4, 6</math>**

2

**Example C**

90

**Solution:** $1, 90, 2, 45, 3, 30, 5, 18, 6, 15, 9, 10$

Do you know now how to help Hector and Allison? Take a look.

Hector and Allison need to organize the students into four groups to go with the four different activities.

They can start by writing out all of the factors for Cluster 6A. The factors will give them the combinations of students that can be sent in groups.

$$
\begin{aligned}
&48 \\
&1 \times 48 \\
&2 \times 24 \\
&3 \times 16 \\
&\left.\begin{array}{l} 4 \times 12 \\ 6 \times 8 \end{array}\right\} \quad \text{These are the two groups that make the most sense}
\end{aligned}
$$

**Now let's find the factors of 44.**

$$
\begin{aligned}
&1 \times 44 \\
&2 \times 22 \\
&4 \times 11 - \text{ This is the group that makes the most sense.}
\end{aligned}
$$

**If Hector and Allison arrange cluster 6A into 4 groups of 12 and cluster 6B into 4 groups of 11, then the groups will be about the same size. There will be 23 students at each activity at one time. This definitely seems like a manageable number.**

**Allison and Hector draw out their plan. They are excited to show their plan for the evening to their teachers.**

## Vocabulary

Here is a vocabulary word in this Concept.

 **Factors**   numbers multiplied together to equal a product.

## Guided Practice

Here is one for you to try on your own.

Name the factors of 12 and 18.

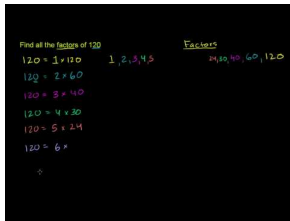**Answer**

First, we can start with 12.

12, 1, 2, 6, 3, 4

Next, we can work with 18.

18, 1, 2, 9, 3, 6

**This is our answer.**

## Video Review

Here is a video for review.





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## Practice

<u>Directions:</u> List out factors for each of the following numbers.

1. 12
2. 10
3. 15
4. 16
5. 56
6. 18
7. 20
8. 22
9. 23
10. 25
11. 27
12. 31
13. 81
14. 48
15. 24
16. 30